Claims

1. A method of illumination, comprising the steps of:

emitting light from each of a plurality of light sources separately arranged in a one-dimensional or two-dimensional form;

spatially decomposing via a light integrator the light emitted from each of the plurality of light sources, and thus generating a multitude of pseudo-secondary light sources; and

overlapping via a condenser lens the light emitted from the multitude of generated pseudo-secondary light sources, and thus illuminating a region to be illuminated.

2. The method of illumination according to claim 1, wherein a region in which the plurality of light sources are arranged, or a light-emitting region of the secondary light sources obtained from the plurality of light sources is made analogous to a shape of the region to be illuminated.

3. The method of illumination according to claim 1, wherein the light sources are semiconductor laser light sources.

4. The method of illumination according to claim 1, wherein the light integrator comprises an array of a

plurality of rod lenses; and

wherein a ratio "$r_1/r_0$" between an aspect ratio "$r_1$" of the sectional shape of each rod lens that is perpendicular to an optical axis thereof, and an aspect ratio "$r_0$" of the region to be illuminated, is 0.8 or more and 1.2 or less.

5. The method of illumination according to claim 1, wherein the light entering the light integrator or the light exiting the light integrator passes through a modulator which varies wavefronts.

6. The method of illumination according to claim 1, wherein a divergence angle in the light flux emitted from each of the plurality of light sources is adjusted to stay within a ratio of 1 versus 1.5 with respect to any two directions within a plane vertical to an optical axis of the emitted light flux.

7. The method of illumination according to claim 1, wherein energy of the light emitted from the light sources is controlled.

8. The method of illumination according to claim 1, wherein each light ray emitted from the plurality of light sources or from secondary light sources is caused to enter an associated position on the light integrator via condensing optical system.

9. A method of illumination, wherein light emitted

from each of a plurality of light sources separately arranged in a one-dimensional or two-dimensional form is applied onto an illumination target region so that at least 30% of energy of the light emitted from each of the light sources arrives at the illumination target region without overstepping an illuminance nonuniformity range of ±10% in the illumination target region.

10. A method of light exposure, comprising the steps of:

emitting light from each of a plurality of light sources separately arranged in a one-dimensional or two-dimensional form;

spatially decomposing via a light integrator the light emitted from each of the plural light sources, and thus generating a multitude of pseudo-secondary light sources; and

overlapping via a condenser lens the light emitted from the multitude of generated pseudo-secondary light sources, and thus illuminating an illumination target region having a pattern to be exposed;

wherein the illuminated pattern to be exposed is exposed by projecting transmitted or reflected light onto an exposure target region of an exposure target object via projection optical system.

11. The method of light exposure according to claim

10, said method being characterized in that a region in which the plurality of light sources are arranged, or a light-emitting region of the secondary light sources obtained from the plurality of light sources is made analogous to a shape of the region to be illuminated.

12. The method of light exposure according to claim 10, wherein the light sources are semiconductor lasers light sources.

13. The method of light exposure according to claim 10, wherein the light integrator comprises an array of a plurality of rod lenses; and

wherein a ratio "$r_1/r_0$" between an aspect ratio "$r_1$" of the sectional shape of each rod lens that is perpendicular to an optical axis thereof, and an aspect ratio "$r_0$" of the region to be illuminated, is 0.8 or more and 1.2 or less.

14. The method of light exposure according to claim 10, wherein the light entering the light integrator or the light exiting the light integrator passes through a modulator which varies wavefronts.

15. A light exposure apparatus comprising:

an illumination optical system including:

a light source array formed of a plural separate light sources arranged one-dimensionally or two-dimensionally;

a condensing optical system for condensing light emitted from each light source of said light source array;

a light integrator for spatially decomposing the light condensed by said condensing optical system, and thus generating a multitude of pseudo-secondary light sources; and

a condenser lens for overlapping the light rays emitted from the multitude of pseudo-secondary light sources generated by said light integrator, and thus illuminating an illumination target region having a pattern to be exposed; and

a projection optical system for projecting transmitted or reflected light onto an exposure target region of an exposure target object in order to expose the pattern to be exposed that is illuminated by said illumination optical system.

16. The light exposure apparatus according to claim 15, wherein in said illumination optical system, a region in which the plurality of light sources are arranged, or a light-emitting region of the secondary light sources obtained from the plurality of light sources is made analogous to a shape of the region to be illuminated.

17. The light exposure apparatus according to claim 15, wherein in said light source array of said illumination optical system, the light sources are semiconductor lasers

light sources.

18. The light exposure apparatus according to claim 15, wherein said light integrator of said illumination optical system comprises an array of a plurality of rod lenses and is adapted such that a ratio "$r_1/r_0$" between an aspect ratio "$r_1$" of the sectional shape of each rod lens that is perpendicular to an optical axis thereof, and an aspect ratio "$r_0$" of the region to be illuminated, is 0.8 or more and 1.2 or less.

19. The light exposure apparatus according to claim 15, wherein said illumination optical system further includes a modulator that varies wavefronts of light, on the incident side or exit side of said light integrator.

20. The light exposure apparatus according to claim 15, wherein said illumination optical system further includes divergence angle adjusting optical system for adjusting a divergence angle of the light emitted from each light source of said light source array.

21. The light exposure apparatus according to claim 20, wherein said divergence angle adjusting optical system include a cylindrical lens.

22. The light exposure apparatus according to claim 15, wherein said illumination optical system further includes light source control means for performing energy control of the light emitted from said light sources of

said light source array.

23. The light exposure apparatus according to claim 15, wherein said illumination optical system further includes a detector for measuring intensity of the light emitted from said light sources of said light source array.